

DEQ Wind Energy Regulatory Advisory Panel (Wind RAP)

October 29, 2009 Meeting

Final Meeting Notes

Location: DEQ Central Office, 2nd Floor Conference Room
629 E. Main Street, Richmond, VA 23219

Start: 9:40 am

End: 4:17pm

RAP Lead/Facilitator: Carol Wampler, DEQ

Recorder: Debra Miller, DEQ

RAP Members Present:

Julie Langan, DHR

Bob Bisha, Dominion

Ray Fernald, DGIF

James Golden, DEQ

Nikki Rovner, Deputy SNR

Judy Dunscomb, TNC

Larry Land, Virginia Assoc. of Counties

Ronald Jenkins, DOF

Larry Jackson, Appalachian Power

Stephen Versen, VDACS

Tom Smith, DCR

Tony Watkinson, VMRC

Ken Jurman, DMME

Mary Elfner, Audubon

Jonathan Miles, JMU

John Daniel, Troutman Sanders

Dan Holmes, Piedmont Environmental Council

RAP Members Absent:

Jayme Hill, Sierra Club-VA Chapter

Theo deWolff, Independent Developer

Public Attendees:

John Davy, DCR (alternate)

Roger Chaffe, OAG

Kathryn Amirpashaie, Research Asst

Jim Madden, BP Wind

Robert Hare, Dominion

Scott Francis, Dominion

Molly Parker Plautz, Dominion

Chad Smith, PBS&J

Michelle Satterlund, PECl

Roger Kirchen, DHR (alternate)

Elizabeth Murphy- VMRC (alternate)

David Phemister, TNC (alternate)

Richard Reynolds, DGIF (alternate)

Don Giecek, Invenergy (alternate)

Emil Avram, Dominion (alternate)

Larry Nichols, VDACS (alternate)

Agenda Item: Introductions

Discussion Leader: Carol Wampler

Discussion: The RAP members and other attendees were welcomed. After the introductions, Carol thanked all for their work on the subcommittees. Today marks the beginning of the plenary process as the subcommittees will report out on their recommendations and findings. The order of presentation will be general, living resources, and then landscape. All were reminded that clarification questions may be asked but discussion of the merits will be reserved for later.

Agenda Item: General Subcommittee Report

Discussion Leaders: Nikki Rovner, General Subcommittee Chair

Discussion: The recommendations of the general subcommittee were presented in the form of draft regulatory language to the RAP members and were reviewed by section. This General Subcommittee recommendations/language is provided in Attachment A. The rationale for the language used was explained to the plenary group including issues that the subcommittee is raising for further discussion. This report included review of sections on: authority; applicability (includes language to address the de minimis question); definitions; PBR submittals; criteria for plans; decommissioning; public participation; ownership

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changes; decommissioning/financial assurance; and fees. The 500kW de minimis threshold was further explained during the review of the applicability section. The subcommittee used 500 kW, which is also the net-metering threshold. Additionally, the subcommittee looked at other “tier” threshold for other groups such as less than 5MW. This issue warrants further discussion by the plenary group. Some definitions may require further clarification, such as interconnection point for project boundary and rated capacity. The basis for decommissioning inclusion in the regulation was discussed. It was noted that this is an issue as the statute does not address decommissioning but it is also not an inclusive list of criteria. For the procedures section, the time for DEQ to respond may need to be adjusted based on what the applicant will need to submit and what DEQ may need to review. It was noted that the applicant may not have the type of turbines to be used upon application, and how would that affect the PBR submittal? It was clarified that during the public participation process, the subcommittee recommends that the “applicant” will notice and host the public meeting. Additionally, it was further clarified that the public meeting is not a formal hearing under the APA so no oral comments will be taken. The details of public participation and DEQ input/participation in the public meeting will need to be addressed further. Changes after the PBR is received (owner change, repowering, etc.) is also addressed by the proposed language. There are materiality concerns by industry and also ownership/permit transfer; these may require clarification of the language. Finally, it was noted that the final section on fees is not yet complete as what needs to be done will need to be determined first prior to DEQ’s being able to provide appropriate fees.

Agenda Item: Living Resources Subcommittee Report

Discussion Leader: Judy Dunscomb, Living Resources Subcommittee Chair

Discussion: The recommendations from the Living Resources Subcommittee were presented to the plenary group (presentation inserted below). This subcommittee focused on § 10.1197.6.B.7 and B.8 of the statute. The issues considered for regulation include pre-construction monitoring, determination of significant impact, mitigation, and post-construction monitoring. The recommended language is also provided in Attachment B. It should be noted that the subcommittee met yesterday and did refine some of the issues. Judy will provide the updates to Carol. During the presentation, it was suggested that much of the specificity of the language may be best provided in attachments or addendum, or perhaps guidance. Where to place detailed specific criteria for the issues discussed will likely require further discussion by the RAP. Further clarification of the criteria was provided regarding the “per turbine” monetary and fatality cap issue (more justification will be forthcoming from subcommittee members).



Living Resources
Report Presentation

Following conclusion of this report, the RAP broke for lunch.

Agenda Item: Landscape Subcommittee Report

Discussion Leader: Jonathan Miles, Landscape Subcommittee Chair

Discussion: The recommendations from the landscape subcommittee were presented to the RAP. The scope of work defined related to the potential adverse impacts of wind energy systems at the landscape scale. The key topics of consideration included: the role of local land use law, planning, and permitting and its relationship to the PBR; adverse visual impacts to historical resources and scenic landscapes; and a variety of specific adverse environmental impacts to both geophysical and living natural resources. The key guiding principles were: PBR should facilitate the permitting of wind energy projects; PBR should impose such conditions and standards necessary to protect the Commonwealth’s natural resources; PRB should, where relevant, require an analysis of the beneficial and adverse impacts of the proposed project on natural resources; PBR should, if significant adverse impacts to historic resources are likely, require the submission of a mitigation plan. The categories for important landscapes were presented to the RAP. The landscape

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subcommittee explicitly addressed the role of local land use law, planning, and permitting and its relationship to the PBR. There may be issues as local governments have varying ability to deal with different issues, such as E&S. The Landscape Subcommittee recommendations regarding local government authority and each of the subcategories for important landscapes were presented along with the rationale, agreement, and concerns. These are summarized in the presentation enclosed below:



Landscape.pdf

Agenda Item: Public Forum

Discussion Leader: Carol Wampler, DEQ

Discussion: No one had signed up to speak, so no public forum was held.

Agenda Item: Issues for RAP Discussion

Discussion Leader: Carol Wampler, DEQ

Discussion: Carol will formulate a list of issues that the plenary group will need to discuss based on the recommendations reported today. This will be a first cut and provided to the RAP for their comments. It was noted that there are many issues that are not completely resolved and some for which conceptual work is not yet developed.

Carol noted that the subcommittees' reports had been reviewed by senior staff at the OAG and DEQ. With assistance from Roger Chaffe and James Golden, she summarized the results of these reviews for the group, as outlined below. There are questions on what can and what cannot be done by this regulation, as there may be some topics/issues that the regulation cannot cover as there is no legal authority to do so. However, it was noted, that these issues could still be looked at and possibly referred to the appropriate agency/local government with recommendations.

The topic of de minimis was then introduced for discussion. Legal advice indicates that there is a possibility to use the definition of the facility to establish de minimis exemption; however, the statute does not clearly provide DEQ authority for setting a de minimis exemption, and the issue would be best resolved by the legislature. The discussion on this issue will continue.

The topic of pre-application conference and consultation was discussed. The statute provides for DEQ to consult with agencies in the Natural Resources Secretariat before issuing a permit; however, only DEQ has the regulatory authority for the PBR. We are advised that requiring the applicant to consult with another agency and seek that other agency's direction in fulfilling PBR requirements would be inconsistent with the statute's provisions.

For erosion and sedimentation, the Landscape Subcommittee recommended that DEQ exercise authority over the issue at project sites. Legal advice indicates that it is not permissible for DEQ to do so. DCR has the regulatory authority over E&S, so the PBR regulation cannot do more than reference DCR's authority regarding this program.

The Landscape Subcommittee's report and white papers indicated that a number of issues related to wind projects traditionally fall within the authority of local governments. These issues include such things as setbacks, shadow flicker, noise, signal interference. Legal advice indicates that such issues are probably not within the scope of the PBR.

Although subcommittee reports included recommendations regarding decommissioning, legal advice indicates that DEQ lacks statutory authority to address decommissioning.

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The statute provides that the applicant, where relevant, should analyze impacts of the proposed project on natural resources. (Section 10.1-1197.6.B.7) The statute only provides that DEQ may require mitigation for significant adverse impacts on wildlife and historic resources. (Section 10.1-1197.6.B.8) Therefore, we are advised that nothing beyond analysis can be required for resources such as forest impacts, agricultural impacts, or scenic impacts (see Landscape reports).

The statute also references beneficial impacts of the proposed project on attainment of NAAQS and on natural resources. Beneficial impacts were not addressed by any subcommittee and will be further discussed, with possible input from DEQ's air division.

DEQ and OAG review also pointed up concerns about the degree of suggested activity regarding invasive species, the \$5000 cap on wildlife mitigation/post-construction monitoring, and the 10-bat fatality standard. Carol noted that it is important to DEQ that our regulation be consistent with federal guidance. She referenced the USFWS guidance, which is expected to become final in the next few months.

It was noted that the next meeting will be on November 12, 2009, at DEQ Central Office. Additionally, another meeting will be held on November 16, 2009, and it will begin at 9am, instead of the usual 9:30am start time. The meeting was concluded and all adjourned at 4:17pm.

Attachment A

Wind RAP, General Subcommittee Second Discussion Draft of regulation, selected sections

Section 1. Authority, applicability and definitions

A. This regulation is issued under authority of Article 5 (§ 10.1-1197.5 et seq.) of Chapter 11.1 of Title 10.1 of the Code of Virginia. The regulation contains the application filing requirements for all wind-powered electric generation facilities consisting of wind turbines and associated facilities with a single interconnection to the electrical grid that are designed for, or capable of, operation at a rated capacity of equal to or greater than 500 kilowatts and equal to or less than 100 megawatts.

Note: support for the 500 kW threshold was not unanimous. Some subcommittee members were willing to agree to such a threshold only if the regulation includes other “tiers,” or sizes below which some but not all requirements of the PBR would apply. Some subcommittee members felt that the 5MW threshold that currently applies to projects that must receive SCC approval should be adopted for the PBR regulation.

B. As used in this chapter:

“Department” means the Department of Environmental Quality

"Operator" means the person responsible for the overall operation and site management of a wind energy facility.

"Owner" means the person who owns all or a portion of a small renewable energy project facility or part of a wind energy facility.

"Permit by rule" means provisions of the regulations stating that a wind energy facility or activity is deemed to have a permit if it meets the requirements of the provision.

“Project boundaries” means area encompassed by a wind energy facility that is under common ownership or operating control. Electrical infrastructure and other appurtenant structures up to the interconnection point shall be considered to be within the project boundaries.

“Rated capacity” means the maximum capacity that a wind energy facility can deliver at the interconnection point.

“Wind energy facility” means a wind- powered electric generation facility, whose main purpose is to supply electricity, consisting of one or more wind turbines and other accessory structures and buildings, including substations, meteorological towers, electrical infrastructure, transmission lines and other appurtenant structures and facilities within the project boundaries. Two or more wind energy facilities, otherwise spatially separated but under common ownership or operation control that are connected to the

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electrical grid under a single interconnection agreement shall be considered a single wind energy facility.

Note: one subcommittee member suggested definitions for “invasive species” and “mitigation plan” that the subcommittee did not have time to discuss. Has “significant adverse impact” been defined by the other subcommittees?

Section 2. Permit by rule for wind energy facilities.

A. The owner or operator of a wind energy facility shall be deemed to have a small renewable energy project permit if he:

1. Furnishes to the director all the documents listed in §10.1-1197.6 B 1, 2, 3, 4, 5, 6 and 12;
2. Furnishes to the director the analysis of potential environmental impacts meeting the standards of section _____, and, if the Department determines that significant adverse impacts to wildlife or historic resources are likely, a mitigation plan meeting the standards of section _____. The mitigation plan shall be an addendum to the operating plan of the wind energy facility, and the owner or operator shall implement the mitigation plan as deemed complete by the Department. The mitigation plan shall be considered an enforceable part of the permit by rule;
3. Furnishes to the director a certification signed by a professional engineer licensed in Virginia that the project is designed in accordance with section 5. The facility design requirements shall be considered an enforceable part of the permit by rule.
4. Submits to the director an operating plan describing how the standards of section 4 will be met. The operating plan shall be considered an enforceable part of the permit by rule;
5. Submits to the director a decommissioning plan and proof of financial assurance describing how the standards of section 6 will be met. The decommissioning plan shall be considered an enforceable part of the permit by rule; and
6. Submits to the director a detailed site plan meeting the requirements of Section 3; and
7. Submits to the director the results of the public participation effort, including a copy of all written comments received and the response to those comments, conducted in accordance with the requirements contained in section 7.

B. Upon receiving the certifications and other required documents, including a report on the results of the public meeting required by section 7 and the applicant's response to the comments received, the Department shall respond within 30? 60? calendar days. (*Note: The subcommittee felt that more discussion was required to determine the appropriate time period.*) If the applicant's submission is administratively incomplete, the letter will state that the facility will not be considered to have a permit-by-rule until the missing

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certifications or other required documentation is submitted and determined by the Department to be complete.

Section 3. Site plan and area map requirements.

A. The applicant shall submit a site plan that includes maps showing the physical features and land cover of the area within the project boundaries, both before and after construction of the proposed project. The site plan shall be submitted at *X:1 (?? Subcommittee was not sure)* scale and shall include 1) the project boundaries, 2) the location, height, and dimensions of all existing and proposed wind turbines, other structures, fencing and other infrastructure, 3) the location, grades, and dimensions of all temporary and permanent on-site and access roads from the nearest county or state maintained road, 4) existing topography, and 5) water bodies, waterways, wetlands, and drainage channels.

B. The applicant shall submit a context map including the area encompassed by a 5 mile radius around the project boundaries. The context map shall show state and federal resource lands and other protected areas, state roads, waterways, locality boundaries and transmission and substation infrastructure.

Section 4. Operating plan requirements.

The wind energy facility shall be operated in accordance with its operating plan. Such operating plan shall include standards ensuring that:

1. The wind energy facility will be operated in compliance with its mitigation plan, if such a plan is required.
2. The wind energy facility will be operated in accordance with all applicable permits and regulations.
3. Invasive species shall not be introduced, installed, propagated within the project boundaries, and the owner or operator shall make reasonable efforts to avoid accidental introductions of invasive species within the project boundaries.

Section 5. Facility design standards.

The installation and design of the wind energy facility shall conform to applicable industry standards, including those of the American National Standards Institute, and take into consideration local conditions. All structural, electrical and mechanical components of the wind energy facility shall conform to relevant and applicable local, state and national codes.

Section 6. Decommissioning, site restoration and financial assurance requirements.

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Note: the subcommittee did not have time to achieve agreement on this section. Further discussion is needed on subsections B and C. After the last subcommittee meeting, DEQ provided 47 pages of financial assurance requirements, some or all of which would replace subsections D, E, F, G and H. Some members of the subcommittee believed subsection I should be replaced with a provision that stating that state decommissioning, site restoration and financial assurance requirements should only apply if there are no local requirements.

A. The owner or operator shall, at his expense, complete decommissioning of the wind energy facility, or individual wind turbines, within twelve months after the end of the useful life of the facility or individual wind turbines. The wind energy facility or individual wind turbines will be presumed to be at the end of its useful life if no electricity is generated for a continuous period of twelve months.

B. Decommissioning shall include removal of wind turbines, buildings, cabling, electrical components, roads, foundations to a depth of 36 inches, and any other associated facilities in a way that controls, minimizes or eliminates post-closure adverse impacts of the facility on human health or the environment.

C. The site within the project boundaries shall be restored as follows, unless the landowner submits to the Department a letter stating that the area within the project boundaries or designated portions thereof will have a post-decommissioning use incompatible with these restoration requirements. In that case, the owner or operator shall restore disturbed areas as necessary to comply with subsection B of this section.

1. Any excavated areas shall be backfilled with material of quality comparable to immediate surrounding area.

2. The site shall be re-graded to the approximate original contours present prior to commencement of construction. This activity shall include the removal of all roads constructed to develop and service the facility.

3. The site shall be prepared and re-planted to restore native vegetative cover to a condition similar to the vegetative cover present at the site prior to commencement of construction. Site preparation shall address soil compaction issues, control of invasive species, and other reasonable actions necessary to increase success of re-vegetation efforts.

D. A professional engineer licensed in Virginia shall be retained to estimate the total cost of decommissioning ("decommissioning costs") without regard to salvage value of the equipment, and the cost of decommissioning net salvage value of the equipment ("net decommissioning costs"). Said estimates shall be submitted to the Department after the first year of operation and every fifth year thereafter.

E. The facility owner or operator shall post and maintain decommissioning funds in an amount equal to net decommissioning costs; provided, that at no point shall

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decommissioning funds be less than twenty five percent (25%) of decommissioning costs. The decommissioning funds shall be posted and maintained with a bonding company or federal or commonwealth chartered lending institution chosen by the facility owner or operator posting the financial security, provided that the bonding company or lending institution is authorized to conduct such business within the commonwealth.

F. Decommissioning funds may be in the form of a performance bond, surety bond, letter of credit, or corporate guarantee.

G. If the facility owner or operator fails to complete decommissioning within the 12 month period required by subsection A, then the Department shall complete such decommissioning with the funds set aside as provided in subsection E.

H. The escrow agent shall release the decommissioning funds when the facility owner or operator has demonstrated and the Department concurs that decommissioning has been satisfactorily completed, or upon written approval of the Department in order to implement the decommissioning plan.

I. Nothing in this section shall prevent a locality from imposing more stringent decommissioning, site restoration or financial assurance requirements.

Section 7. Public participation.

A. Before the initiation of any construction at the facility, the owner or operator shall publish a notice once a week for two consecutive weeks in a major local newspaper of general circulation informing the public that he intends to construct and operate a facility eligible for a permit-by-rule. The notice shall include:

1. A brief description of the proposed facility and its location;
2. A statement that the purpose of the public participation is to acquaint the public with the technical aspects of the facility and how the standards and the requirements of this chapter will be met, to identify issues of concern, to facilitate communication and to establish a dialogue between the permittee and persons who may be affected by the facility;
3. Announcement of a 30-day comment period, in accordance with subsection D of this section, and the name, telephone number, and address of the owner's or operator's representative who can be contacted by the interested persons to answer questions or where comments shall be sent;
4. Announcement of the date, time, and place for a public meeting held in accordance with subsection C of this section; and

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5. Location where copies of the documentation to be submitted to the department in support of the permit-by-rule notification and any supporting documents can be viewed and copied.

B. The owner or operator shall place a copy of the documentation and support documents in a location accessible to the public in the vicinity of the proposed facility.

C. The owner or operator shall hold a public meeting not earlier than 15 days after the publication of the notice required in subsection A of this subsection and no later than seven days before the close of the 30-day comment period. The meeting shall be held in the locality, or if the project is located in more than one locality in a place proximate to the location of the proposed project.

D. The public shall be provided 30 days to comment on the technical and the regulatory aspects of the proposal. The comment period will begin on the date the owner or operator publishes the notice in the local newspaper.

Section 8. Change of ownership, facility modifications, loss of permit by rule status, termination.

Note: this section needs additional work, including definitions of materiality and a cure period. Review lines 74-78 of the legislation.

A. A permit by rule may not be transferred by the permittee to a new owner or operator. However, when the property transfer takes place without proper closure, the new owner shall notify the department of the sale and fulfill all the requirements contained in this chapter with the exception of those dealing with the financial assurance. Upon presentation of the financial assurance proof required by section 6 by the new owner, the department will release the old owner from his decommissioning, site restoration and financial responsibilities and acknowledge existence of the new permit by rule in the name of the new owner.

B. Provided such modifications are in accordance with the requirements of the permit by rule and do not increase the rated capacity of the wind energy facility, the owner or operator of a facility operating under a permit by rule may modify its design and operation by furnishing the department a new certificate prepared by the professional engineer and new documentation required under section 1. Whenever modifications in the design or operation of the facility affect the estimate of decommissioning costs prepared pursuant to section 6 D, such a new estimate of such costs shall be submitted to the Department. Should the new estimate reveal an increase in the decommissioning costs, the owner or operator shall submit a new proof of financial responsibility as required by section 6.

C. In the event that a facility operating under a permit by rule violates any applicable design, operating, or decommissioning or site restoration provisions of this chapter the

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owner or operator of the facility will be considered to be operating an unpermitted facility and shall be required to either obtain a new permit or close, as applicable.

D. The director shall terminate permit by rule and shall require closure of the facility whenever he finds that:

1. The applicant has knowingly or willfully misrepresented or failed to disclose a material fact in his disclosure statement, or any other report or certification required under this chapter, or has knowingly or willfully failed to notify the director of any material change to the information in the disclosure statement; or
2. The operation of the facility is inconsistent with the facility's operating plan or the operational requirements of this chapter.

Section 9. Permit fee requirements.

A. Purpose. The purpose of this section is to establish schedules and procedures pertaining to the payment and collection of fees from any owner or operator of a wind energy facility seeking a new permit by rule or seeking a modification to an existing permit by rule. It also establishes schedules and procedures pertaining to the payment and collection of inspection fees from any owner or operator of a wind energy facility.

B. Payment, deposit and use of fees.

1. Due date. All permit certification fees are due on the submittal day of the certification package. The inspection fees for the first year or portion of a year are due as part of the permit certification. Thereafter, all inspection fees are due March 1.
2. Method of payment. Fees shall be paid by check, draft or postal money order made payable to "Treasurer of Virginia/DEQ", and shall be sent to the Department of Environmental Quality, Receipts Control, P.O. Box 10150, Richmond, VA 23240.
3. Incomplete payments. All incomplete payments will be deemed nonpayments.
4. Late payment. No certifications will be deemed complete until the department receives proper payment. In the event that the inspection fee is not received by the department on or prior to March 1, the owner or operator of the facility will be considered to be operating an unpermitted facility.
5. Fee schedules. Each certification for a permit by rule or each certification for a modification to a permit by rule is a separate action and shall be assessed a separate fee. The amount of the permit certification fee is based on the costs associated with the permitting program required by this chapter. An inspection fee will be collected annually and its amount is based on the costs associated with the inspections program conducted by the department. The fee schedules are shown in the following table.

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Type of Action	Fee
Initial certification	\$????
Modification	
with a new estimate of decommissioning costs	\$????
without a a new estimate of decommissioning costs	\$????
Inspections	\$????

Section 10. Enforcement.

The Department may enforce the provisions of this chapter and any permits by rule issued under this chapter in accordance with §§ 10.1-1197.9 through 10.1-1197.11 of the Code of Virginia.

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VA Wind RAP

Living Resource Requirements

Definitions

“Beneficial Impact” is a positive impact to Wildlife or to the general environment in or around the proposed Project Boundary, which is expected to be sustained during construction and/or operation of the wind energy facility.

“VDACS” means the Virginia Department of Agriculture and Consumer Services.

“DCR” means the Virginia Department of Conservation and Recreation.

“DEQ” or “Department” means the Virginia Department of Environmental Quality.

“DGIF” means the Virginia Department of Game and Inland Fisheries.

“Disturbance Zones” means the areas within the project boundary where vegetation management or earth moving activities will occur.

“Ecological Core” means an area of natural land, including forest, marsh, or beach, identified in DCR’s natural landscape assessment (www.dcr.virginia.gov/natural_heritage/vclnavnla.shtml) that is not fragmented, such that it provides at least 100 acres of important interior habitat.

“GDIPD Index” means the Gross Domestic Product Implicit Price Deflator Index, which shall be based on the index in June of each calendar year.

“Invasive Plant Species” means a non-native plant species that cause, or are likely to cause, economic or ecological harm or harm to human health (Presidential Executive Order 13112), and contained on the Department of Conservation and Recreation’s invasive plant species list (http://www.dcr.virginia.gov/natural_heritage/documents/invlist.pdf).

“Mitigation” means sequentially avoiding and minimizing impacts to the maximum extent practicable, and then compensating for remaining unavoidable impacts of a proposed action.

“Operator” means the person responsible for the overall operation and site management of a wind energy facility.

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1 "Owner" means the person who owns a small renewable energy project facility or part
2 of a wind energy facility.

3 "Permit by rule" means provisions of the regulations stating that a facility or activity is
4 deemed to have a permit if it meets the requirements of the provision.

5 "Pre-Construction" means any time prior to commencing land clearing operations
6 necessary to the installation of energy generating structures at the small renewable
7 energy facility.

8 "Post-Construction" means any time after commencing operation of the last turbine on
9 the project or phase of that project.

10 Project Boundary" means the area of land under ownership, easement, lease under
11 control via any other legal means) by the Applicant that will also be directly impacted
12 by construction and operation of the proposed facility, at ground level or in the air
13 space above such ground level.

14 "Project boundary" means area encompassed by a wind energy facility that is under
15 common ownership or operating control. Transmission lines leaving a substation shall
16 not be considered to be within the project boundaries.

17 "Significant Adverse Impact" is an impact to Wildlife that is likely to be detrimental to a
18 species due to the construction or operation of a proposed wind energy facility, based
19 on known presence of the species in or around the proposed Project Boundary.

20 "Wildlife" means Natural Heritage Resources as defined by the *Code of Virginia* §10.1-
21 209 the habitat of rare, threatened, or endangered plant and animal species, rare or
22 state significant natural communities or geologic sites, and similar features of scientific
23 interest benefiting the welfare of the citizens of the Commonwealth, Wildlife Species of
24 greatest conservation need, or a state-listed threatened and/or endangered species in
25 the Commonwealth of Virginia at the time an applicant submits an application.

26 "Wildlife Species" means any animal, insect, or plant that has a species classification.

27 "Wildlife Analysis" means a comprehensive desktop and field survey to find and map
28 Wildlife and suitable habitat for Wildlife, and for which the field survey shall be
29 conducted over four consecutive seasons or the spring/fall seasons (depending on the
30 species being surveyed), in a period not to exceed 12 months.

31 "Wind energy facility" means an electric generation facility, whose main purpose is to
32 supply electricity, consisting of one or more wind turbines and other accessory
33 structures and buildings, including substations, meteorological towers, electrical
34 infrastructure, transmission lines and other appurtenant structures and facilities within
35 the project boundaries.

1 **Pre-Construction Analysis**

2 To fulfill the requirements of §10.1-1197.6, Paragraph B.7, the applicant will conduct Pre-
3 Construction Wildlife Analyses within the Project Boundary. The analysis shall include the
4 following:

5 1. Mapping: The applicant shall attach detailed maps of the proposed Project
6 Boundary providing the results of the Wildlife Analysis for: 1) habitat, and 2) wildlife.

7 a. Habitat Mapping. The applicant will provide a map resulting from the
8 desktop and field surveys within in the Project Boundary. The applicant shall
9 have used the DCR’s “The Natural Communities of Virginia, Classification of
10 Ecological Community Groups, 2nd Approximation” (Fleming, Coulling,
11 Patterson and Taverna, Version 2.2. DCR, Division of Natural Heritage,
12 Richmond, VA) as the vegetation standard to describe and map the
13 ecological community groups on the project area. Additional habitat
14 features including Wildlife habitat (e.g., raptor nests, caves, mines),
15 physiographic features (e.g., rock outcrops, cliffs, wetlands), and
16 unfragmented natural ecosystems that are Ecological Cores will be mapped.
17 If any Invasive Plant Species are identified within the Project Boundary during
18 the normal course of habitat mapping surveys, they will be flagged in the
19 field and mapped. All Invasive Plant Species identified during the mapping
20 exercise shall be managed given currently acceptable standards during
21 construction activities.

22 b. Wildlife Mapping. The applicant will provide a report, including a map, of the
23 desktop and field surveys conducted to determine the existence or potential
24 existence of Wildlife. The applicant will obtain a list of Wildlife from the DGIF,
25 the DCR, and the DACS for the proposed Project Boundary and attach it to
26 this application. The Report shall provide relevant, available details of any
27 Wildlife found onsite, including species, detection location(s), age, size,
28 spatial distribution, evidence of reproduction

29 2. Avian Use Surveys: The applicant will provide a report of the avian use surveys
30 conducted to estimate seasonal use and relative abundance of avian species in
31 the project area, and in particular for raptors.

32 Methodologies:

33 a. Surveys will include sampling during spring (April 1 – June 15) and fall
34 (September 1 – November 15) migration, summer breeding (June 15 – August
35 30), and over-wintering (November 15 – March 31) use within the Project
36 Boundary.

Attachment B

- 1 b. Depending on the size of the proposed Project Boundary and land cover,
2 one or more fixed points will be established within the Project Boundary
3 where there is a good view along ridges or areas of interest and in a fashion
4 that provides coverage of the entire project area. All birds seen during each
5 survey will be recorded. The date, start, and end time of observation period,
6 point number, species or best possible identification, estimated number of
7 individuals, distance from plot center when first observed, closest distance,
8 height above ground, activity, and habitat will be recorded. The habitat type
9 over which or in which the avian was first observation will be identified.
10 Weather information recorded for each survey will include temperature, wind
11 speed, precipitation, wind direction and cloud cover.
- 12 c. Plot surveys will be scheduled to cover all daylight hours. During a survey day,
13 plots will be visited once. Points should be visited at different times of day
14 throughout a season.
- 15 d. Data from the field surveys will be entered into a database and checked
16 thoroughly for data entry errors. The number of raptors and other species
17 seen during each point count survey will be standardized to a unit area and
18 unit time searched. Use will be expressed as the mean number of
19 observations of a species per 20-min survey per survey plot (800-m radius) or
20 5-min survey per survey plot for smaller plots (100-m radius). Mean values and
21 90% confidence intervals will be calculated by season for all species
22 observed and groups and sub-groups of species (e.g., passerines, raptors,
23 *Buteos*)
- 24 e. The resulting avian use data will be compared to data collected at other
25 wind resource areas using similar protocols.
- 26 f. The data gained from fixed-point avian use surveys will be used to assess the
27 existence of avian species also considered to be Wildlife.
- 28 3. Raptor Migration Surveys: The applicant will provide a report resulting from one
29 year of raptor migration surveys in the Project Boundary in both the spring and fall
30 seasons, conducted to determine the relative abundance of migrant raptors
31 moving within the proposed Project Boundary. The raptor survey will follow methods
32 recommended by the Hawk Migration Association of North America (HMANA). The
33 survey period will be based on existing information from established hawk migration
34 sites in Virginia and/or adjacent states and will correspond with the 8-week period
35 when the peak number of migrant hawks would be expected to move through the
36 area. In the spring this period is expected to be approximately mid-March through
37 mid-May and in the fall approximately beginning-September through beginning-
38 November.

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1 Methodologies:

2 a. Surveys will be conducted one day each survey week in the spring and fall
3 for a total of 16 surveys in each migration season. A survey station will be
4 established within the Project Boundary that provides good visibility over long
5 distances along the primary ridgeline or area of interest. The survey period
6 each day will be at least 6 hours from approximately 10:00 AM to 4:00 PM.
7 Observers will watch for migrant raptor continuously during the six hour survey
8 period. Efforts will be made to schedule surveys on days when weather
9 conditions are conducive to hawk migration (e.g., warm clear high pressure
10 conditions). Data will be compiled by survey day and concurrent data from
11 established hawk watch sites will be solicited from HMANA for comparison.

12
13 4. Bat Acoustic Surveys: The applicant will provide a report of bat acoustic surveys
14 conducted to determine the presence of and level of bat activity and use within
15 the proposed Project Boundary.

16 17 Methodologies:

18 a. Bats will be surveyed within the proposed Project Boundary using currently
19 available acoustic detectors (e.g. AnaBat® or accessible equivalent). It is
20 recommended that the applicant use a pulley-mounted system, or employ a
21 suitable alternative, in conjunction with a meteorological tower to install the
22 acoustical detectors to maximize the reliability/maintainability of the
23 equipment and data.

24 b. A minimum of two acoustic detectors will be used during the study and
25 sampling will occur from April 15 to October 15. To the extent possible while
26 still maintaining protection of the equipment, the ground based acoustic
27 detector will be tilted toward the sky to maximize the height at which bat
28 calls will be detected. The second acoustic detector station will be
29 established at a minimum height of 30 m above ground level, or the highest
30 practicable height that allows sampling within the proposed turbine rotor-
31 swept-area. A high microphone system will be connected to this second unit
32 and installed within the Project Boundary. Both acoustic units will sample
33 concurrently. The applicant will take all reasonable measures to ensure that
34 each detector achieves a data collection success rate of at least 50% per
35 season during each surveying period.

36 c. In addition to the index of overall bat activity within the Project Boundary, a
37 relative index of activity by species or species group will also be determined.
38 Bat calls will be identified to species when possible or to species group if call

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1 quality does not allow for positive species identifications. Calls will be
2 identified by comparing visual metrics (e.g., minimum frequency, slope,
3 duration) to reference calls of known bats.

4 5. Mist-Netting and/or Harp-Trapping Study: If the applicant identifies potential for
5 State threatened or endangered bat species to occur within the Project Boundary,
6 including the presence of roosting areas, bat hibernacula, the potential habitat for
7 State threatened or bats, or if a State threatened or endangered bat is observed in
8 the project area, the applicant will conduct a summer mist-netting and/or harp-
9 trapping survey for bats on the site. The survey methods will follow applicable State
10 and/or Federal guidance (e.g. the U.S. Fish and Wildlife Service) guidelines for mist-
11 netting surveys in the Indiana Bat Recovery Plan). The number of sites will be based
12 on the approximate size of the study area or linear distance of proposed
13 turbine/roads strings. The survey will be conducted during the summer season
14 identified in the guidelines, May 15-August 15. Specific details of the survey will be
15 determined by site conditions and survey timing. Netting and/or trapping locations
16 will be determined in the field but will be within the proposed Project Boundary.

17 a. Captured State Threatened or Endangered Bats: For all bats captured,
18 standard data such as species, sex, age, reproductive condition, and other
19 notes will be recorded. For every State threatened or endangered bat
20 captured, a radio transmitter will be attached for radio telemetry. The radio
21 telemetry survey will consist of re-locating each tagged bat for 5-10 days post
22 capture (in consultation with the DGIF) or as long as the radio remains active
23 to determine locations of roost trees used by the tagged bat. Each roost tree
24 located will be mapped and identified to species. Approximate age, size,
25 condition, and topographic position will be recorded for each roost tree. Exit
26 counts at sunset will be made at each roost tree located, if possible.

27
28 **Determination of Beneficial Impacts/Significant Adverse Impacts and Mitigation Plan**
29 **Preparation**

30 Pursuant to § 10.1-1197.6, Paragraph B.8, the Department determine if the information
31 collected in § 10.1-1197.6 Paragraph B.7 indicates that Significant Adverse Impacts to
32 Wildlife are likely. If such impacts are found to be likely the applicant shall submit a
33 mitigation plan detailing reasonable actions to be taken by the applicant to avoid,
34 minimize, or otherwise mitigate such impacts.

35 1. Determination of Beneficial Impacts

36 2. Determination of Significant Adverse Impact: The Department shall find that
37 significant adverse impacts are likely whenever wildlife analyses indicate any of the
38 following:

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- 1 a. Wildlife, Heritage Resources, Ecological Cores, or State Threatened and
2 Endangered Species, are found to occur within 100 feet of the planned
3 disturbance zone;
- 4 b. Migratory or resident songbirds or raptors, breed, forage, roost or migrate
5 through the project boundary;
- 6 c. Bats are observed within the project boundary or hibernacula are
7 determined to occur within 5 km of the project boundary.
- 8 3. Mitigation Plan Preparation: A mitigation plan shall include a description of the
9 affected natural resource and the impact to be mitigated, a description of actions
10 that will be taken to avoid the stated significant adverse impact, and a plan for their
11 implementation. If the impact cannot reasonably be avoided, the plan shall
12 include a description of actions that will be taken to minimize the stated impact,
13 and a plan for their implementation. If neither avoidance nor minimization is
14 reasonably practicable, the plan shall include a description of other measures that
15 may be taken to offset the stated impact, and a plan for their implementation.
- 16 a. For Wildlife, Heritage Resources, and Ecological Cores, the Applicant shall
17 take all reasonable measures to avoid adverse impacts, or shall demonstrate
18 in the mitigation plan why adverse impacts cannot practically be avoided,
19 and why the proposed actions are reasonable.
- 20 b. For State Threatened and Endangered Species, the applicant shall include in
21 the application documentation indicating that the proposed mitigation plan
22 complies with recommendations from either DCR for plants and insects or
23 DGIF for non-insect animals to avoid adverse impacts. If the proposed
24 mitigation plan does not comply with such recommendations, the applicant
25 shall demonstrate in the mitigation plan why adverse impacts cannot
26 practically be avoided, and why the proposed actions are reasonable.
- 27 c. For Migratory or resident songbirds or raptors, the applicant shall take all
28 reasonable measures to minimize adverse impacts.
- 29 d. For bats, the mitigation plan shall include measures to curtail operation of
30 wind turbines on low wind speed nights when bats are likely to be active at
31 the project, and to monitor the efficacy of these measures. Curtailment
32 measures shall be designed either to reduce bat mortality to an average of
33 no more than 10 bats/turbine/year, up to a cost of \$5,000/turbine/year, or
34 maximize avoided bat mortality up to a cost of \$5,000/turbine/year. If
35 measures are designed to achieve fatality levels of no more than
36 10/bats, turbine/year, monitoring efforts shall be adequate to detect that
37 level of impact.

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Post-Construction Avian and Bat Monitoring Protocol

The following post-construction monitoring protocol is designed to document and quantify impacts to avian and bat resources from wind project development.

There are three primary objectives associated with the study:

- 1) Estimate the level of avian and bat mortality associated with the wind project.
- 2) Develop recommendations for management actions to reduce bat mortality at the wind project through conducting a curtailment study.
- 3) Determine the treatment regime that allocates costs or revenue losses per turbine/year to maximize reduction in bat mortality.

The post-construction monitoring study will consist of the following components:

- Seven months of study (April 1 – October 30) for the first year after a project is operational that assess avian and bat mortality through standardized carcass searches, carcass removal trials, and searcher efficiency trials;
- A study designed to investigate the correlation of bat casualties with project operational protocols, weather-related variables, and the effectiveness of operational adjustments to reduce impacts.

Avian and Bat Mortality Study

Impacts to bat will occur during the active season between April and November. The majority of bat casualties at wind-energy facilities have occurred during the late summer and fall migration period. On an annual basis, the study period can be divided into spring from approximately April 1 to June 15, summer June 16 to August 15, and fall August 16 to October 31. These periods cover the peak of the spring raptor and songbird (April-May, September-October) and fall bat (August-September) migrations. The methods for the fatality study are broken into three primary components: (1) standardized carcass searches, (2) searcher efficiency trials, and (3) carcass removal trials.

The number of avian and bat fatalities will be estimated based on the number of avian and bat fatalities found in search plots around turbines and whose death appears related to collision with turbines. All carcasses located within areas surveyed, regardless of species, will be recorded and a cause of death determined, if possible, based on field inspection of the carcass. Total number of avian and bat carcasses will be estimated by adjusting for removal bias (e.g., scavenging), searcher efficiency bias,

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1 and sampling effort. Carcasses where the cause of death is not apparent will be
2 included in the fatality estimate.

3 4 Selection and Delineation of Carcass Search Plots

5
6 For wind projects with greater than 15 turbines, 30% of the turbines will be selected
7 for inclusion in the study. For wind project with less than 15 turbines 5 turbines will be
8 selected for inclusion in the study. The sample of turbines should be selected to
9 provide even coverage of the entire project.

10
11 For an eight week period from approximately August 1 through September 30, and
12 additional set of turbines will be selected for inclusion in the study to investigate the
13 correlation of bat fatalities with turbine operation and weather patterns. A minimum
14 of five additional turbines will be selected for each treatment variable chosen for
15 the study.

16
17 Search plots will be established around each sampled turbine and will be
18 delineated in the field and with a GPS for detailed habitat mapping. For most
19 projects, it is likely that search plot size will be variable and dependent on the area
20 around the turbine that is clear of vegetation. Given the difficulty in finding birds and
21 bats within thick shrub cover or forested areas, the search area will be limited to the
22 cleared areas, and these areas should be maintained as clear as well as possible to
23 facilitate the searches. Efforts will be made to maximize the search plots, such as
24 extending plots along the roads, but searches will not be conducted in forested
25 areas or areas with steep rocky slopes. Adjustments to the fatality estimates will be
26 made to account for the unsampled areas (areas beyond the search plot
27 boundaries) using existing information regarding spatial distribution of fatalities within
28 search plots at this project and at other projects. Detailed limits of the search plots
29 for each turbine will be mapped using GPS units and detailed aerial maps/photos of
30 the development as constructed.

31
32 Periodic vegetation management (i.e., mowing) will be used to facilitate the search
33 effort by maintaining lower vegetation height in the search plots. If needed
34 because vegetation grows too quickly, an increase in mowing frequency of the
35 search plots may be requested. If possible, all mowing activity of search plots will be
36 conducted immediately following a standardized search to minimize potential
37 carcass removal due to mowing.

38 39 Scheduling/Timing

40

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1 The study period will be divided into spring (April 15 to June 15), summer (June 16 to
2 August 15) and fall (August 16 to October 31). This study period is designed to
3 incorporate the key months for spring and fall raptor and passerine migration, and
4 bat migration in the fall. It will also estimate the effect of the wind project on resident
5 species during the summer. Carcass search frequency for the 30% of the turbines
6 will be weekly. For the additional turbines included in the turbine operation and
7 weather study, the search frequency will be daily.

8 9 Standardized Carcass Searches

10
11 Objective: To systematically search a sample of the project for avian and bat
12 fatalities that are attributable to collision with turbines or met towers.

13
14 Personnel trained in proper search techniques should conduct the carcass searches.
15 Transects within search plots will be set approximately 5-6 meters apart in the area
16 to be searched. Searchers (field technicians) will walk at a rate of approximately 45-
17 60 m/min along each transect searching both sides out to 2-3 meters for casualties.
18 The condition of each carcass found will be recorded using the following condition
19 categories:

- 20 • Intact – a carcass that is completely intact, is not badly decomposed,
21 and shows no sign of being fed upon by a predator or scavenger.
- 22 • Scavenged – an entire carcass, which shows signs of being fed upon by a
23 predator or scavenger, a portion(s) of a carcass in one location (e.g.,
24 wings, skeletal remains, legs, pieces of skin, etc.), or a carcass with heavy
25 insect infestation.
- 26 • Feather Spot - 10 or more feathers or 2 or more primary feathers at one
27 location indicating predation or scavenging.

28
29 For all casualties found, data recorded will include: species, sex and age when
30 possible, date and time collected, GPS location, physical condition (e.g., intact,
31 scavenged, feather spot), estimated time of death, and any comments that may
32 indicate cause of death. All casualties located will be photographed as found and
33 mapped on a map of the study area showing the location of the wind turbine and
34 associated facilities such as access roads, substations, and buildings. Dominant
35 vegetation cover and visibility index for the carcass location will also be recorded.

36 37 Searcher Efficiency Trials

38
39 Objective: To estimate the percent of avian/bat fatalities that are found by
40 searchers.

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1 Searcher efficiency studies will be conducted in the same areas carcass searches
2 occur and during the entire study period. Searcher efficiency will be estimated by
3 carcass size and visibility class. Estimates of searcher efficiency will be used to adjust
4 the number of carcasses found by correcting for detection bias.

5
6 During the study period, between 50 and 100 carcasses in each size class (small
7 birds, medium to large birds, bats) for each visibility class (easy, moderate, difficult,
8 very difficult) will be used for searcher efficiency trials. To gain the preferred sample
9 sizes without saturating search plots, trials will be conducted throughout the study
10 period and in all weather conditions. During each week of study, approximately 1-2
11 large carcasses and 2-3 small avian and bat carcasses will be placed randomly
12 throughout the sample of search plots. All carcasses will be placed at pre-
13 determined random locations within areas being searched prior to the carcass
14 search on the same day. Carcasses will be dropped from shoulder or waist height
15 to simulate a falling avian or bat.

16
17 Each trial carcass will be discreetly marked so that it can be identified as a study
18 carcass after it is found. The number and location of trial carcasses found during a
19 standardized search will be recorded. The number of carcasses available for
20 detection during each trial will be determined immediately after the trial by the
21 person responsible for distributing the carcasses, and carcasses removed.

22 23 Carcass Removal Trials

24
25 Objective: To estimate the length of time avian/bat fatalities remain in the search
26 area.

27
28 Carcass removal studies will be conducted throughout the study period. Estimates of
29 carcass removal will be used to adjust the number of carcasses found by correcting
30 for removal bias..

31
32 All trial carcasses will be placed within 60 m of turbines that are not included in the
33 set of sampled turbines. Reducing the number of planted carcasses near turbines
34 minimizes the possibility of increasing scavenging at the turbines due to an
35 additional food source being provided.

36
37 During the study period between 50 and 100 carcasses in each size class (small
38 birds, medium to large birds, bats) for each visibility class (easy, moderate, difficult,
39 very difficult) will be used for carcass removal trials. Typically a given trial will consist
40 of a small number of carcasses randomly placed throughout the study areas. To
41 provide a sufficient sample size, carcasses from each size class will be placed in the

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1 field and monitored for 14 days. The trials will be spread throughout the study period
2 to incorporate the effects of varying site, scavenger, and weather conditions.

3
4 Experimental carcasses will be marked discreetly so that it can be identified as a
5 study carcass. Experimental carcasses will be left at the location until the end of the
6 trial (14 days), at which time any remaining carcasses or evidence of the carcass
7 (e.g., feather spot) will be removed.

8 9 Statistical Methods for Estimation of Fatality Rates

10
11 The estimate of the total number of wind turbine-related fatalities will be based on
12 four components: 1) observed number of carcasses, 2) searcher efficiency
13 expressed as the proportion of trial carcasses found by searchers, 3) removal rates
14 expressed as the length of time a carcass is expected to remain in the study area
15 and be available for detection by the searchers, and 4) the estimated percent of
16 casualties that likely fell in non-searched areas based on the distribution of observed
17 casualties and percent of area searched around turbines.

18
19 Statistical methods for calculating the average number of observed carcasses, the
20 estimate of searcher efficiency, the estimate of carcass removal, and the estimate
21 of the total number of casualties will follow current techniques used in similar studies.

22
23 Annual fatality estimates for raptors, passerines, nocturnal migrant passerines, other
24 birds, all birds combined and bats will be calculated. Information from the project
25 site will be used to assess mortality in relation to weather variables. The wind speed,
26 direction, temperature, precipitation and any other data available from the project
27 site (e.g., turbines or met tower) will be requested and used in an analysis to
28 correlate numbers of fatalities from the turbines where daily searches occur.
29 Information from the project production (operations) monitoring will be used to
30 assess mortality in relation to turbine operation. The turbine operation data, for
31 example hours per night of operation, rotations per minute (rpm), from the turbines
32 where scheduled searches take place will be requested and used in an analysis to
33 correlate observed and adjusted numbers of fatalities with turbine operations.

34 35 Curtailment Study

36 In addition to the 30% of sample turbines searched to further quantify bat mortality, 12
37 additional turbines will be systematically selected from turbines available for surveys for
38 implementing initial management actions related to changes in cut-in speeds. During
39 each night, three treatment regimes (i.e., change in cut-in speeds) with four replicates
40 each will be implemented at the study turbines: 1) fully operational, 2) cut-in speed at
41 X.X m/s, 3) cut-in speed at X.X m/s for X hours. Treatments will be randomly assigned to

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1 study turbines each week. Nights will be considered the experimental unit and daily
2 searches will be conducted at the 12 turbines from August 1 to September 30 using
3 methods described above for fatality surveys.

4
5 Data from these study turbines and the turbines within the 30% pool will be used to
6 estimate environmental and biological factors that could be used to predict when bat
7 mortality occurs, which will be used to further refine optimal implementation of
8 management actions.

9
10 Biological variables and metrics will include measures of fatality and measures of
11 activity. Number of bats (aggregated and separated by group or species) found per
12 turbine per night and number of fresh bats (estimated to have occurred the previous
13 night) will be the primary fatality metrics used. Bat activity metrics will include hourly
14 and nightly bat call rates (# bat calls per detector night). Environmental variables
15 measured will include weather information including wind speeds, wind direction,
16 temperature, barometric pressure, humidity, and other indices relative to passage of
17 storm fronts and general weather conditions. Weather information will be collected
18 from meteorological towers and wind turbines in the project, and from the National
19 Weather Service. Wind turbine characteristics measured will include, average rpm's,
20 operating time, and energy production.

21
22 Bats will be surveyed in the project area using acoustic detectors (e.g. AnaBat® or
23 accessible equivalent). At a minimum three detectors will be deployed to turbines
24 included in the curtailment study - one for each treatment group - from August 1 to
25 September 30. Each detector will be left at a chosen turbine for 7 consecutive nights
26 before recovery of the systems for data download. Detectors will be placed at ground
27 level on a stand to elevate the microphone at least one meter about ground level.

28
29 For this study, the number of bat passes per unit time will be the metric of interest and
30 will be used as an index to bat use of the project area. A pass is defined as a train of
31 echolocation calls produced by an individual bat, and consists of a continuous series of
32 ≥ 2 call notes with no pauses between call notes of > 1 second. The number of bat
33 passes will be determined by downloading the calls from the ZCAIMS onto a computer
34 and counting the number of echolocation passes recorded.

35 36 Optimizing Management Based on Effectiveness and Cost

37
38 The third objective will be addressed by selecting and testing the optimal management
39 action(s), where optimal is defined as the implementation of management actions to
40 achieve a maximum level of reduction in bat mortality based on the economic
41 constraints. Predictive models of bat mortality as a function of biological variables,

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1 environmental variables, and wind turbine variables may identify implementation of
2 selective curtailment or other management actions as the optimal management
3 action for maximizing reduction in bat mortality.

4
5 This management action involves developing a model based on empirical data for
6 determining nights of expected high bat mortality in which to implement curtailment of
7 turbines. Curtailment of turbines could involve changing the cut-in speeds or
8 completely shutting down turbines for select nights or periods.

9 10 Management Action Effectiveness Determination

11
12 Estimated mortality reductions and associated costs will be calculated for various
13 management action alternatives used in the study. Management actions to consider
14 for additional testing or for recommendation will be developed using a cost and
15 effectiveness evaluation based on the study results. For example, if the goal is to
16 reduce tree-roosting bat mortality by 50 percent, then the management action(s) that
17 are estimated or predicted to achieve 50 percent reduction for the minimum cost may
18 be further tested if high uncertainty exists after the study, or may be recommended for
19 immediate implementation if low uncertainty exists. Further testing may not be required
20 if change in cut-in speeds for the entire study period is selected as an optimal
21 management action. However, if selective curtailment or change in cut-in speeds are
22 selected as a preferred management action, then additional validation may be
23 needed to determine true effectiveness. Effectiveness of management actions,
24 including change in cut-in speeds, will be estimated based on fitting generalized linear
25 mixed models. In addition, predictive models of bat mortality will be developed using
26 the biological, environmental, and wind turbine characteristic variables described
27 above.

28 29 Post-Construction Wildlife Mitigation and Management

30 1. Post-Construction Mitigation: After completing the initial 1 year of Post-Construction
31 monitoring and any Significant Adverse Impacts are confirmed, the applicant shall
32 submit a plan consisting of its proposed monitoring and mitigation actions expected
33 to be implemented for the remainder of the project's operating life. If it is
34 determined by the applicant that Significant Adverse Impacts are not confirmed,
35 then the applicant will review the results with the DEQ within 60 days of completion
36 of such findings, and if agreed, no further mitigation by the applicant will be
37 required.

38
39 2. Amendment of Mitigation Plan: After 3 years of post-construction mitigation efforts,
40 the Operator of the facility may initiate a consultation with the Department to

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1 propose amendments to the mitigation plan. The Department may amend the
2 mitigation plan if it determines that the proposed amendment will avoid or minimize
3 adverse impacts to a demonstrably equal or greater extent as the mitigation
4 measures being implemented at that time. Alternatively, the Department may
5 amend the mitigation plan if the Operator demonstrates that: the mitigation
6 measures being implemented at that time are not effectively avoiding or minimizing
7 adverse impacts, and; the proposed amendments are preferable methods to
8 mitigate for ongoing adverse impacts.

- 9
- 10 3. Invasive Plant Species Management: Native plant species appropriate to the site
11 will be utilized as part of the construction and landscaping process. In the ordinary
12 course of construction or operation of the facility, if any Invasive Plant Species are
13 identified, they will be removed and discarded from the site.

14 **Post-Construction Monitoring and Mitigation Financial Cap**

15
16
17 After the facility is in commercial operation for one full year, the applicant shall fund
18 monitoring and mitigation activities in subsequent years based upon the
19 recommendations of the year 1 report. The applicant shall incur up to but not exceed
20 \$5,000 per turbine per calendar year for direct or indirect costs or lost revenue resulting
21 from any monitoring and mitigation. This cap will be annually adjusted beginning on
22 January 1, 2012 using the GDIPD Index. If upon review of the results of the initial 1-year
23 Post-Construction monitoring program that is determined by the applicant and the DEQ
24 that there are no Significant Adverse Impacts, then the applicant will not be required to
25 continue any monitoring or begin any mitigation for that Wildlife Species. If applicable,
26 the applicant will be required to file a report every 5th anniversary of the last turbine
27 placed in commercial operation at the wind energy facility illustrating how the funds
28 are applied to natural resource monitoring and mitigation at the operating facility.